

satellite system operator cannot simply wait until its capacity is saturated and then add additional transmitters or frequencies. Satellites typically take several years to design, construct and launch, and once launched they cannot be modified.^{34/}

In light of these very long lead times, it would be impractical for a satellite system operator to wait until the system is operating at full capacity before it applies for expansion capacity. The NPRM's suggestion that an NVNG satellite system operator would only be entitled to seek expansion capacity after its system was saturated ignores these real world constraints on the ability of a satellite system to add capacity rapidly.^{35/}

ORBCOMM is also puzzled by the NPRM's tentative conclusion that it would not be in the public interest to allow the initial licensees to be eligible for additional spectrum "on the basis of speculative long-term traffic projections."^{36/} The Commission does not explain why the traffic projections of the first round licensees are any more "speculative" than the traffic projections of the new second round applicants. Indeed, ORBCOMM

^{34/} For these reasons, the Commission provides extensive lead times in the milestone dates prescribed in the NVNG system licenses. ORBCOMM is well ahead of the construction deadlines set forth in its licensing order, which do not call for launch of the remaining satellites until December 2000. ORBCOMM Licensing Order, 9 FCC Rcd 6476 at ¶ 34. ORBCOMM expects to begin launching the remainder of the satellites in its constellation next year, and to complete the system deployment by early 1998.

^{35/} Cf., NPRM at ¶ 38: "we want to ensure that licensees are making full use of their assigned spectrum before they are granted expansion capacity. Currently none of the three Little LEO licensees is operating at full capacity."

^{36/} NPRM at ¶ 38.

believes that its extensive efforts in actually developing the NVNG satellite service market provide it with a much greater understanding of that marketplace than any new entrant's market surveys. Moreover, ORBCOMM can serve the expected growth in demand more efficiently than the new entrants because it requires only a small incremental increase in spectrum. Thus, the public interest would be better served if ORBCOMM was provided access to that spectrum.

Nor would it be an acceptable response to suggest that ORBCOMM could simply await future allocations and use that spectrum to meet its expansion needs. Such a suggestion ignores the need for satellite system operators to plan many years in advance, and such planning cannot rationally occur where critical factors are unknown. More importantly, unless the additional spectrum was immediately adjacent to the current NVNG frequencies in the 137-138 MHz and 148-150.05 MHz bands, ORBCOMM could not readily make use of that spectrum for its current satellite system. The satellites and user transceivers would have to be modified extensively to operate across a wide range of frequencies, increasing the costs significantly (and unnecessarily). As a result, the scale and scope economies otherwise available to ORBCOMM would be eliminated, to the detriment of ORBCOMM's subscribers.

In sum, ORBCOMM has demonstrated that the public interest would be well served by its obtaining a small amount of additional spectrum -- service to Alaska and Europe would improve dramatically, additional export opportunities would be created, and ORBCOMM's reliability and availability generally would

improve. As such, ORBCOMM believes it has met the NPRM's challenge to demonstrate that the consumer benefits outweigh the presumed benefits of increasing the number of direct competitors.^{37/} Such a belief is reinforced by the fact that the NPRM's market analysis is severely flawed, and does not fully consider the competitive alternatives that will be present even if the Commission does not license three new NVNG satellite systems as proposed in the NPRM.

C. The NPRM's Market Analysis Is Severely Flawed

The NPRM attempts to justify its proposal to exclude the first round licensees from access to any additional spectrum in this processing round by performing a market analysis purporting to examine how the market would perform with only the three current licensees versus how it would perform if the Commission authorized an additional one, two or three NVNG satellite systems.^{38/} Such an academic exercise does not provide any probative evidence, particularly because (i) the NPRM's market analysis is premised on an incorrect characterization of the market that ignores the availability of foreign-licensed NVNG satellite systems as well as potential alternatives and substitutes for NVNG satellite services; and (ii) the NPRM's analysis is based solely on hypotheses (since there are no fully operational NVNG satellite systems).

^{37/} NPRM at ¶ 20.

^{38/} NPRM at ¶ 21.

1. The NPRM's Market Analysis Ignores
Foreign-Licensed NVNG Satellite Systems

The NPRM market analysis apparently assumes that the market consists solely of U.S.-licensed NVNG satellite systems.^{39/} The NPRM's request for comparison of market performance with "only three little LEO satellite systems versus how it would perform if there were four, five or six systems" ignores the presence of currently notified foreign-licensed NVNG satellite systems, as well as the numerous NVNG satellite systems that have been proposed by other countries.

Russia has already begun deployment of the GONETS NVNG satellite system, which is operating in the bands allocated to Mobile Satellite Services on a secondary basis at WARC-92 (312-315 MHz and 387-390 MHz). The French government has been coordinating through the ITU its 20 satellite S80-1 little LEO satellite system, and has notified through the ITU and been operating an experimental satellite (S80-T) as a precursor for that system. Indeed, the United States has already engaged in coordination discussions with the French government with regard to shared use of the 137-138 MHz, 148-150.05 MHz and 400.15-401 MHz bands by S80-1, ORBCOMM, Starsys, VITA and various U.S. governmental satellite systems.

In addition, another ten or so countries have advance published, are coordinating or have notified at the ITU various non-geostationary satellite systems operating in the 137-138 MHz

^{39/} NPRM at ¶ 21.

and 148-149.9 MHz bands (with some countries registering multiple systems). The following chart reflects this ITU activity:

NON-GSO SYSTEMS USING RESOLUTION 46 PROCEDURES

1 = 137-138 MHz, 2 = 148-149.9 MHz
A = Advance Published, N = Notified, C = Coordinated

| SYSTEM NAME | ADMINISTRATION | STATUS | DATE |
|-------------|----------------|--------|----------|
| MLMS | Belgium | 1-2/A | 7/6/94 |
| FASAT-BRAVO | Chile | 2/1 | 23/5/95 |
| SAFIR | Germany | 1/C | 7/9/93 |
| S-80-1 | France | 1-2/N | 22/2/94 |
| S-80-T | France | 1/N | 14/1/92 |
| TEMISAT | Israel | 1-2/N | 25/1/94 |
| LEOMEX-1 | Mexico | 1-2/A | 18/10/94 |
| TONGASAT | Tonga | 1-2/A | 27/10/92 |
| EYESAT | Uganda | 2/C | 8/11/94 |
| SITCHI | Ukraine | 1/A | 11/6/96 |
| LEOTEL-1 | United States | 1-2/N | 9/2/93 |
| LEOTEL-2 | United States | 1-2/C | 7/12/93 |
| LEOTEL-3 | United States | 2/C | 24/8/93 |

ORBCOMM does not believe that all of these systems will be launched, insofar as the list likely includes some speculative proposals (e.g., TONGASAT). However, there is evidence that several other countries (in addition to France and Russia) are planning to license and launch commercial NVNG satellite systems that intend to compete with ORBCOMM, including Belgium, Chile, Mexico, Canada, Australia, Korea, Germany and Portugal. Thus, the NPRM's market structure analysis, proposing to justify the exclusion of the first round licensees by assuming a market of three initial licensees and up to three additional U.S.-licensed systems, is defective because it completely ignores the presence

of these other NVNG satellite systems already authorized or to be licensed by foreign countries.

2. The NPRM's Market Analysis
Improperly Excludes Substitutes
for NVNG Satellite Services

The NPRM's market analysis is also defective because it does not fully take into account all of the other services and systems that may be comparable to, or substitutes for, the commercial radio location and two-way data messaging services that may be offered by NVNG satellite systems.^{40/} Many other operational or planned satellite systems will be capable of offering competing services, on either a regional or global basis. These other satellite systems include global geostationary mobile satellite systems (e.g., Inmarsat^{41/}), regional mobile satellite systems (e.g., AMSC, Omnitrac), and the Big LEO satellite systems (including the three current U.S. licensees and the Inmarsat affiliate, all of whom have satellite systems under construction).

NVNG satellite systems should be less costly to deploy initially than geostationary systems or Big LEO systems, although Little LEO systems are also somewhat less robust in terms of their service capabilities because of bandwidth and regulatory

^{40/} NPRM at ¶¶ 27-28.

^{41/} Inmarsat has announced a new offering, Inmarsat D+, which will provide global two-way paging and messaging service to compete with the Little LEOs.

constraints (i.e., voice services will not be provided).^{42/} Nonetheless, these other satellite systems may be cost competitive, on an incremental basis, when compared to ORBCOMM's NVNG satellite system.^{43/} In addition, the regional or global reach of these alternatives may be sufficient to meet most, if not all, of the geographic demand for NVNG satellite service applications.^{44/} Thus, the Commission's market analysis should include these Geostationary Mobile Satellite Services and Big LEO satellite systems.

A proper market analysis should also consider all of the terrestrial mobile services that will be competing with

^{42/} While the NVNG satellite system costs are likely to be lower than these alternatives, ORBCOMM believes that the current record may not accurately reflect the costs of deploying NVNG satellite systems. Some of the second round applicants have made incredible claims as to the low projected costs of their systems. ORBCOMM has challenged those claims as unsupported and inconsistent with ORBCOMM's actual experience. See e.g., ORBCOMM Comments on the CTA Application at pp. 3-5 (February 24, 1995); ORBCOMM Comments on the Final Analysis Application at pp. 2-3 (February 24, 1995); Comments of ORBCOMM on the Leo One Application at pp. 6-8 (November 16, 1994). ORBCOMM does not believe that the Commission can rely upon those cost projections for purposes of evaluating the applicants' financial eligibility, nor should it rely upon such claims as a basis for excluding the geostationary and Big LEO satellite systems from the market structure analysis.

^{43/} These systems apparently view themselves as serving the same customers and markets as the NVNG satellite systems, and thus presumably view themselves as cost competitive. E.g., Loral's Convertible Preferred Equivalent Obligations Offering Memorandum, dated November, 1996, at p. 62 ("In addition to supporting voice services, the Globalstar System is also expected to function as a worldwide paging and alphanumeric messaging service.").

^{44/} Because ORBCOMM anticipates that many applications will only require service on a regional basis, the Commission should not limit the market under review strictly to commercial radio location and two-way data messaging anywhere in the world. See NPRM at ¶ 24. ORBCOMM believes that regional services (both terrestrial and satellite) must also be included in the market structure analysis.

ORBCOMM for specific applications. For example, there are numerous wireless alternatives for remote meter reading and asset tracking and monitoring.^{45/} With respect to messaging and data transfer, various service alternatives presently exist, including one-way paging, two-way paging, narrowband PCS, broadband PCS, SMR and cellular service. Indeed, the Commission considered these various alternatives in concluding that ORBCOMM would face sufficient competition so as to render mandated common carrier regulation unnecessary.^{46/}

While these terrestrial alternatives are not perfect substitutes for every potential NVNG satellite service application, they certainly exert significant competitive pressure on many of the intended uses at the edge of their coverage areas. It is ORBCOMM's understanding that these terrestrial systems, when compared on a "throughput" basis, will typically enjoy significant cost advantages over NVNG satellite systems.^{47/} Thus, it will be difficult for Little LEOs to compete against terrestrial offerings within dense urban areas. Nevertheless, in light of these cost advantages, the Commission's market analysis should also have factored in these terrestrial

^{45/} E.g., Highwaymaster, RAM Mobile Data and ARDIS advertise nationwide coverage.

^{46/} ORBCOMM Licensing Order, 9 FCC Rcd at p. 6481 ("Further, we found that sufficient competitive capacity exists, or will exist, to obviate any need to impose a legal compulsion to serve the public indifferently.").

^{47/} Cf., NPRM at ¶ 28 ("We request comment as well on the implication of the assertion by some applicants that Little LEOs provide service at a lower price than non-Little LEO suppliers of the same services.").

competitors' downward pressure on the prices that Little LEOs can charge.

ORBCOMM believes that when all of the relevant market contestants are included in a market structure analysis, the resulting marketplace is already sufficiently competitive to obviate the need for the proposed eligibility restriction. ORBCOMM will face competition from global satellite systems, regional satellite systems, and regional terrestrial systems. Taken together, these various substitutes and competitors will make for a highly competitive marketplace.

Indeed, the proposal to preclude the first round licensees from obtaining additional spectrum in this processing round will artificially hamper ORBCOMM's ability to compete with these other satellite and terrestrial systems. To the extent that the market includes foreign-licensed NVNG satellite systems, the United States could thereby lose the manifold benefits of its having developed the NVNG satellite service and produced the market leaders.

3. The NPRM's Market Analysis Is Flawed Because It Is Not Based on Any Real-World Information

The NPRM proposes to use a structure-conduct-performance paradigm of modern industrial organization economics to support its exclusion of the first round licensees from the second processing round. While such a tool may have value in examining functioning markets, ORBCOMM does not believe that the NPRM's attempted analysis using this approach has any probative value with respect to analyzing industries that have not yet

become fully operational. Where, as here, there is no empirical evidence, but only forecasts, speculation and assumptions with regard to structure, conduct and performance, the results are strictly the result of a hypothetical analysis that will be driven solely by the input and assumptions of the modeler. Any outcome can be produced by simply adjusting the inputs to the paradigm, because there is no real-world Little LEO full constellation experience to suggest what the inputs to the analysis actually should be. This fatal defect permeates the NPRM's structure-conduct-performance analysis.

The NPRM's analysis begins by purporting to review the characteristics of basic market conditions by examining the demand and supply for Little LEO services. To date, however, ORBCOMM is the only NVNG satellite system providing commercial service, and those offerings are limited because of the intermittent availability of service from its first two satellites in orbit. Many of the anticipated applications for NVNG satellite services will require near full-time availability, including tracking, two-way messaging, and search and rescue operations. While ORBCOMM has undertaken significant market research and begun marketing activities, it will not be possible to gauge actual demand until full commercial service is available. Thus, any attempt to calculate elasticities of supply and demand would be strictly a hypothetical exercise driven solely by projections or assumptions, and consequently of little real value.

Likewise, in examining the alternative sources of supply for the types of services that will be made available by

NVNG satellite systems, the NPRM seeks input on the relative prices that the different service providers will charge.^{48/} ORBCOMM questions the reliability of any price information that will be proffered since many of the NVNG or alternative satellite systems (such as the Big LEOs) are not yet operational. Any submitted price information will be nothing short of speculation. Moreover, there will be an absence of any actual cost (or perhaps more relevant, marginal cost) information, because these licensed or proposed systems have not yet been constructed, launched or operated.^{49/}

A similar problem arises with respect to the conduct portion of the structure-conduct-performance market analysis set forth in the NPRM. The analysis speculates on the likelihood of tacit or overt cooperation among the sellers based on an assumption of only three competitors.^{50/} However, there will be significantly more than three competitors operating in the more broadly and properly defined market described above, including foreign-licensed NVNG satellite systems, Big LEO satellite

^{48/} NPRM at ¶ 28.

^{49/} As noted previously, many system proponents have submitted artificially low cost estimates for their NVNG satellite systems in order to meet the Commission's financial qualifications test. Those unrealistic claimed costs should not be relied on by the Commission for gauging whether the applicant is financially qualified, nor should they be considered as part of a structure-conduct-performance market analysis.

^{50/} NPRM at ¶ 33. But cf., JET-TEL Group Limited Partnership, Order, DA 96-2061, released December 9, 1996 at ¶ 15 (three air-ground systems currently compete with each other, so that the "mere fact that JET-TEL seeks to be a fourth competitor in air-ground industry does not entitle it to a waiver. JET-TEL offers no substantiation for its claim that the three operating licensees will act in an anti-competitive manner if JET-TEL's extension request is not granted.").

systems, global and regional geostationary mobile satellite systems, and terrestrial alternatives. Moreover, there are no grounds to assume that the NVNG satellite system operators will collude rather than compete. Indeed, quite the contrary is true, given the importance of being early to market in securing major customers (and particularly considering the significant cost to a user of switching to a new competitor). Thus, no support for excluding the first round licensees can be provided by the NPRM's conduct "analysis."

The NPRM's performance analysis suffers from the same flaw as its market and conduct analyses -- the absence of any empirical information. Comparing performance of how the market would perform under different scenarios is nothing more than a hypothetical exercise when there have been no operations under any scenarios. Moreover, the NPRM's assumptions with respect to the relative costs of the technologies and absence of substitute services have been demonstrated to be unfounded. Thus, there is no evidence to support the NPRM's tentative conclusion that the benefits of restricting the first round licensees' eligibility would likely outweigh any cost in terms of lost economies of scale.^{51/}

In attempting to justify the exclusion of the first round licensees, the NPRM also relies upon the assumptions made by the first round licensees reflected in the sharing proposal with regard to the possibility of future entry.^{52/} ORBCOMM

^{51/} NPRM at ¶ 35.

^{52/} NPRM at ¶ 36.

believes that the Commission must factor into a review of those earlier statements some events that have occurred subsequent to the Negotiated Rulemaking. In their jointly filed comments putting forth their sharing proposal, the three first round applicants indicated that:

The Applicants have no intention to exclude additional entrants from these bands, and note in this regard that their May 18, 1992 Proposed Service Rules for the Non-Voice Non-Geostationary Satellite Services specifically contemplate further entry.^{53/}

Similarly, in response to claims that the three initial applicants were attempting to preclude additional entry, ORBCOMM stated:

In the context of the negotiated rulemaking, the three applicants submitted a sharing proposal that was an attempt by the parties with concrete proposals to develop a means of coexisting in the limited spectrum made available; it was not an attempt to freeze out future applicants, because as was made clear in the negotiated rulemaking proceeding, and as the Final Report of the Advisory Committee concluded, additional entrants may reasonably be accommodated in the spectrum that was allocated by the Commission.^{54/}

In fact, additional entry has already been accommodated within the limited spectrum allocated to NVNG satellite services as reflected by the coordination between the United States and France that shows that sharing is possible.

On the other hand, the joint sharing plan (and the opportunity for additional entry) was premised on the initial

^{53/} Jointly Filed Supplemental Comments of ORBCOMM, STARSYS and VITA in CC Docket No. 92-76, filed August 7, 1992 at p. 2.

^{54/} Comments of ORBCOMM in CC Docket No. 92-76, submitted May 26, 1993 at p. 3.

applicants' understanding of the sharing environment, including the need to coordinate with the government users in these bands.^{55/} Subsequent coordination with the U.S. government has significantly reduced the ability to share the spectrum with additional systems. For example, at an early stage Starsys had calculated that it could share on a co-frequency basis with multiple additional spread spectrum systems.^{56/} However, limits on the power flux density levels at which Starsys could operate imposed as a result of later actual coordination with the U.S. government apparently have severely constrained Starsys' ability to share the spectrum on a co-frequency basis with additional spread spectrum systems (as well as making it more difficult for Starsys and ORBCOMM to share the 137-138 MHz band). Starsys now appears to be able to share co-frequency with one additional spread spectrum system (i.e., the French S80-1).

ORBCOMM's ability to share with additional NVNG satellite systems also has been constrained as a result of the

^{55/} E.g., Jointly Filed Supplemental Comments of ORBCOMM, STARSYS and VITA in CC Docket No. 92-76, filed August 7, 1992 at n. 2:

To the extent that subsequent, actual operating conditions differ from the Applicants' expectations, the Applicants are committed to engaging in good faith negotiations to develop a proposal for an alternative sharing arrangement that will satisfy the needs of all of the licensees. In addition, the frequencies selected from within the bands have been based on preliminary informal discussions with the U.S. government. There may thus be a need for some adjustments depending on the final coordination with the U.S. government.

^{56/} E.g., Report of the Below 1 GHz LEO Negotiated Rulemaking Committee, September 16, 1992 at p. 8 ("Theoretically, this spectrum will be able to accommodate as many as three additional CDMA users depending upon the amount of noise in the band from existing users.").

U.S. government's subsequent coordination requirements. In the 137-138 MHz band, NOAA now requires a 50 kHz band for each of the APT signals, as opposed to the 34 kHz band previously indicated. An additional guard band of 40.5 kHz is also now required for the LRPT signals, and presumably would also be required for the MetSat system to be developed in the upper NOAA band (137.825-138.000 MHz). Because an additional 113 kHz of spectrum is occupied by MetSats (out of the 422 kHz previously thought to be available to MSS), it is now much more difficult for additional FDMA/TDMA Little LEO systems to operate in the 137-138 MHz band without also causing harmful interference to ORBCOMM. Thus, the subsequent coordination with the U.S. government has reduced the ability of additional FDMA/TDMA and/or CDMA NVNG satellite systems to share the limited spectrum that has been allocated for the NVNG satellite service. ORBCOMM believes that the initial applicants' optimistic expectations regarding their ability to accommodate additional entry must be tempered by these subsequent developments that were beyond their control.

Finally, in seeking to define the market, the NPRM poses the question whether entry barriers exist and what steps the Commission can undertake to lower those barriers.^{57/} In this regard, ORBCOMM believes that the highest entry barrier at present is the absence of enough suitable spectrum to meet anticipated service demands. The Commission may be able to help eliminate that hurdle by working with the NVNG satellite service providers to obtain additional global allocations at WRC-97.

^{57/} NPRM at ¶ 29.

III. The Commission Should Apply Its Financial
Qualifications Standards Strictly

Although there is some ambiguity in the NPRM with regard to the financial qualifications test that will be applied in this second processing round, the NPRM suggests that the standard be changed to require an applicant to demonstrate that it has the resources to construct, launch and operate for one year its entire system (rather than merely the ability to construct, launch and operate for one year the first two satellites in its constellation).^{58/} The NPRM later indicates that the applicants can amend their applications to adapt their systems to the proposals in the Notice, and must demonstrate, inter alia, "finances sufficient to launch and operate two satellites in their system for a year."^{59/} ORBCOMM interprets the somewhat inconsistent language as an indication that the Commission proposes to adopt a "full constellation" standard for the future, but does not intend to apply such a standard retroactively to the current applicants. ORBCOMM would support such a policy, insofar as the Commission is limited in its ability to adopt retroactive changes to its Rules.^{60/}

ORBCOMM believes that the Commission should, in the future, require applicants to demonstrate their current financial ability to construct, launch and operate their full constellation. Particularly in light of the relatively small

^{58/} NPRM at ¶ 40.

^{59/} NPRM at ¶ 103.

^{60/} See pp. 10-16, supra.

amount of spectrum available, the Commission should avoid awarding licenses to companies that lack the resources to capitalize on assigned spectrum promptly.^{61/} Given the significant investment necessary to deploy a satellite system, the Commission's experiences with underfunded applicants confirms the wisdom of applying a strict financial qualifications test.^{62/}

Although the Commission cannot retroactively apply a different financial qualifications standard, ORBCOMM urges the Commission in this second processing round to apply strictly its current test. That is, the applicants must demonstrate their current ability (through committed outside funding or sufficient current assets and operating income) to fund the full costs to construct, launch and operate for one year the initial two satellites in their constellation.^{63/} The Commission must therefore require the applicants to update their applications to

^{61/} The public interest would be disserved by such a valuable resource lying fallow, regardless of whether the Commission awards licenses by auction or otherwise.

^{62/} See e.g., National Exchange Satellite, Memorandum Opinion and Order, 7 FCC Rcd 1990 (Comm. Carr. Bur. 1992); Advanced Business Communications, Inc., Memorandum Opinion and Order, 100 FCC 2d 525 (1985); Rainbow Satellite, Inc., Memorandum Opinion and Order, Mimeo No. 2584 (Comm. Carr. Bur. released February 14, 1985); United States Satellite Systems, Inc., Memorandum Opinion and Order, Mimeo No. 2583 (Comm. Carr. Bur. released February 14, 1985); Advanced Communications, Inc., Memorandum Opinion and Order, FCC 95-428, released October 18, 1995.

^{63/} Applicants also should not be permitted to minimize their projected costs by specifying experimental payloads as the initial two satellites. The applicants should have to demonstrate the ability to finance at least two satellites capable of supporting commercial operations, along with the necessary ground segment (including Earth stations, operations software and customer support).

reflect their present financial conditions.^{64/} The Commission must also require the applicants to provide full and accurate cost estimates; ORBCOMM has challenged many of those estimates as unrealistic and incomplete (since they included only incremental and not total costs).^{65/} Applicants should not be permitted intentionally to understate their costs merely to meet the financial qualifications standards.

IV. The NPRM's Sharing Proposals Should Be Revised to Allow the Spectrum to Be Used Productively by the Current Licensees and to Avoid Degradation to the Current NVNG Licensees

The NPRM sets forth some spectrum sharing proposals that would allow it to license three new NVNG satellite systems.^{66/} As a general matter, ORBCOMM disagrees with the

^{64/} Events subsequent to the filing of the original applications may have adversely affected some of the applicants' financial qualifications. For example, ORBCOMM observes that CTA in its September 10, 1996 SEC Form S-1 at Note 5 of its June 30, 1996 Consolidated Financial Statements indicated that: "The development of the initial GEMnet satellites and the full satellite system will require capital in excess of that committed or currently available to the Company. Accordingly, the Company will need to obtain additional capital from other partners and/or raise additional debt and/or equity financing." ORBCOMM also observes that Leo One relied upon the resources of the David A. Bayer Trust to demonstrate its financial qualifications, and it is not clear whether those assets have been diminished as a result of the financial difficulties of MobileMedia, another communications company in which Mr. Bayer is a principal. See e.g., Land Mobile Radio News, November 22, 1996, "MobileMedia CEO Resigns; Company Warns it May File for Bankruptcy Protection". ORBCOMM also observes that E-Systems' parent, Echostar, has been required to pay for at least one DBS slot that it was awarded at auction, and it is not clear whether such a payment will lessen the amount of its current assets being relied on to demonstrate financial qualifications in this processing round.

^{65/} See n. 42, supra.

^{66/} NPRM at ¶¶ 41-77.

underlying premise of the NPRM spectrum sharing proposals -- the notion that a maximum number of new entrants must be accommodated and the current licensees should not have access to any additional spectrum in this processing round. As detailed above, the public interest would be well served by providing ORBCOMM with access to a small amount of additional spectrum so that it could provide service with even greater reliability and availability. The three spectrum blocks proposed in the NPRM, however, are designed solely to allow the licensing of three new systems, and would not accommodate ORBCOMM's needs.

ORBCOMM believes that the sharing proposals can be modified so as to allow the Commission to license additional NVNG satellite systems without precluding ORBCOMM from also obtaining access to the additional spectrum it requested. Set forth below are ORBCOMM's recommendations with regard to the specific sharing proposals set forth in the NPRM. Initially, however, ORBCOMM has a few general observations on the sharing scheme incorporated into the NPRM. First, ORBCOMM does not object per se to additional entry; ORBCOMM does object to the automatic foreclosure of its request for additional spectrum, and it does object to any new systems that will cause harmful interference and thereby degrade ORBCOMM's services to its customers. ORBCOMM remains willing to coordinate in good faith with any new NVNG satellite systems authorized by the Commission.^{67/}

^{67/} In this light, ORBCOMM directs other NVNG satellite system planners to Draft New Recommendation ITU-R[XJ], "Sharing Criteria for Space-to-Earth Links Operating in the Mobile-Satellite Service with Non-Geostationary Satellites in the 137-138 MHz Band," which provides sharing criteria for NVNG satellite systems.

In addition, ORBCOMM observes that the NPRM proposes to rely on time sharing and frequency coordination to allow the different systems to share the bands with the current users and licensees. Co-frequency sharing with NVNG systems using spread spectrum modulation techniques apparently has not been incorporated into the proposals to any degree. ORBCOMM presumes that Starsys has a limited ability in the 137-138 MHz band to share with additional spread spectrum systems (in addition to the French S80-1 system) because of the power limits necessitated by the coordination with the U.S. government. ORBCOMM does not know, however, the extent to which new Little LEO systems can operate in the other bands in which Starsys will operate using spread spectrum modulation. For example, other systems may be able to operate subscriber uplinks in the lower half of the 148-149.9 MHz band. ORBCOMM will rely on Starsys to address this possibility in its comments or reply comments.

ORBCOMM also generally endorses the NPRM's proposal to rely on time sharing among nongeostationary satellite systems as a coordination technique. While such an approach does require the cooperation of both systems to ensure that the necessary information for coordination is available, ORBCOMM believes that this method should be workable as long as the satellites are designed to operate with a sufficient number of stored timed commands. ORBCOMM is incorporating similar techniques into its sharing arrangement with Starsys, whereby certain ORBCOMM downlink channels will operate at lower power levels when in the mainbeam of a Starsys Earth station antenna. Although ORBCOMM and Starsys have not yet actually used this sharing technique

because neither system has been fully deployed, ORBCOMM is confident that such a sharing technique is practical and effective.

A. Little LEO System-1

The NPRM would license an additional NVNG satellite system to operate in the same bands as VITA, using time sharing to accommodate VITA's single authorized satellite.^{68/} ORBCOMM notes that with respect to the proposal, the NPRM incorrectly suggests that ORBCOMM will not be operating in the 149.81-149.9 MHz portion of the band. In fact, consistent with its authorization and the Joint Sharing Agreement, ORBCOMM will be operating subscriber uplink transmissions throughout the upper portion of the 148-149.9 MHz band, using its Dynamic Channel Activity Assignment System ("DCAAS") to avoid interference to VITA's operations.^{69/} Thus, any system proposing to operate in

^{68/} NPRM at ¶ 46. ORBCOMM finds it somewhat ironic that the Commission now views VITA's use of the spectrum as relatively inefficient, insofar as its satellite will be visible to a user only a small percentage of time. NPRM at ¶¶ 46-47. In its comments on the original NVNG service rules, ORBCOMM had advocated a minimum availability requirement (ORBCOMM Comments in CC Docket No. 92-76, filed April 26, 1993 at pp. 15-20), but the service rules adopted by the Commission rejected that suggestion.

^{69/} In addressing the 148-149.9 MHz band, the Joint Sharing Agreement submitted by ORBCOMM, Starsys and VITA at p. 3 provided:

ORBCOMM would be licensed to operate over the entire bandwidth, employing Dynamic Channel Activity Assignment System (DCAAS) frequency division multiple access (FDMA) modulation techniques, for uplink operations. ORBCOMM initially would confine its operations to the portion of the band above 148.905 MHz (the "upper" part of the band) in
(continued...)

these blocks of spectrum must factor into their system design the fact that ORBCOMM will be operating in the 149.81-149.9 MHz band.

B. Little LEO System-2

The NPRM also proposes licensing an additional NVNG satellite system in some of the spectrum in which ORBCOMM is authorized to operate -- the 148.905-149.81 MHz and 137-138 MHz bands. ORBCOMM has several concerns with this proposal. With respect to the downlinks (137-138 MHz), ORBCOMM agrees with the NPRM's statement that any system proposing to use this band must demonstrate how it will avoid causing harmful interference to ORBCOMM's use of this band, including the planned use of the band under the scheme being negotiated by ORBCOMM and NOAA pursuant to a re-coordination of the band.^{70/} As the Commission suggests,

^{69/} (...continued)

order to obviate potential interference to the STARSYS operations in this band. ORBCOMM would use the upper part of the band for its DCAAS operation and for its 50 kHz earth station uplink. ...

VITA would use 90 kHz in the band for its FDMA uplink transmissions. VITA's 90 kHz segment would be in the upper part of the band, separate from STARSYS' operations, and separate from ORBCOMM's 50 kHz earth station uplink. ORBCOMM's uplink operations will avoid interference with VITA's system in this band by detecting and avoiding VITA's uplink transmissions.

^{70/} NPRM at ¶ 53. ORBCOMM observes that the NPRM did not correctly reflect that planned use. ORBCOMM would operate, using time-sharing techniques, in the NOAA Beacon Bands (137.333-137.367 MHz and 137.753-137.787 MHz), not the APT Bands (137.485-137.515 MHz and 137.605-137.635 MHz) set forth in the NPRM. The Beacon channels were selected because they are further from the center frequency of Starsys' operations in this band, and therefore easier to coordinate with Starsys. In addition, ORBCOMM observes that its sharing agreement with NOAA will require ORBCOMM to reduce the power and bandwidth on its channel
(continued...)

however, an additional system should be able to make use of the spectrum now assigned to NOAA, since some of that spectrum will be vacated, and time sharing with NOAA's satellites with respect to other frequencies in the band should be possible.

ORBCOMM is more troubled by the NPRM's suggested uplink frequencies for this system. While some additional sharing of the band for subscriber uplinks may be possible using a DCAAS-like scheme, sharing of the gateway uplinks is not possible.^{70/} In addition, it is not clear how much sharing of the subscriber uplinks can be accommodated successfully, particularly because the NPRM proposes to "cram" two new NVNG satellite systems into the upper half of the 148-149.9 MHz band. Both Little LEO System-1 and Little LEO System-2 would be operating in this portion of the band, along with ORBCOMM, VITA and terrestrial users.

It is not clear whether the systems will be able to find a sufficient number of unoccupied channels for reliable, interference-free subscriber uplinks in the upper half of the 148-149.9 MHz band. ORBCOMM has been actively monitoring the 148-149.9 MHz band since the launch of its initial two

^{70/}(...continued)

S5 (137.4475-137.4725 MHz) under certain conditions to protect NOAA operations in the adjacent APT channel (137.475-137.525 MHz). When NOAA vacates that band, those conditions will no longer exist and ORBCOMM will return to full licensed power and bandwidth. Any proposed new entrant thus must take into account ORBCOMM's use of this channel on a full power basis. Sharing criteria for this band are contained in Draft New Recommendation ITU-R[XJ], "Sharing Criteria for Space-to-Earth Links Operating in the Mobile-Satellite Service with Non-Geostationary Satellites in the 137-138 MHz Band."

^{71/} NPRM at n. 36.

satellites. ORBCOMM has observed that, particularly during peak periods, it appears that there are dramatic drops in the number of available channels, and hence the margin by which the number of unoccupied channels exceeds the number of channels needed for a single system's successful operations.^{72/} ORBCOMM is concerned that with additional NVNG satellite systems operating, there may not be a sufficient number of unoccupied channels to ensure that all of the systems will be able to function.

ORBCOMM suggests two potential alternative plans to avoid this serious problem: use of both the lower and upper halves of the 148-149.9 MHz band for DCAAS-like subscriber uplinks and/or use of the spectrum allocated at WRC-95 for subscriber uplinks. With regard to the first option, ORBCOMM believes it should be possible for Little LEO System-2 to operate its subscriber uplinks in the lower portion of the 148-149.9 MHz band where Starsys will be operating its spread spectrum uplinks without causing harmful interference to Starsys. ORBCOMM and Starsys left open the possibility of sharing that spectrum, but did not explore the technical details of such co-frequency operations in the lower half of the 148-149.9 MHz band.^{73/} Of course, without knowing the specific operating parameters of the proposed new NVNG satellite systems, it may not be possible for

^{72/} Attachment 1 is a series of six graphs representing the channel availability over the Eastern United States (as reflected by ORBCOMM's satellite passes over its Dulles, Virginia Earth station) during different times of day. As the graphs indicate, the number of available channels in the 148-149.9 MHz band ranges from over 500 (during the period of 11:50 am - 12:01 pm EST) to less than 80 (during the period of 12:16 pm - 12:28 pm EST).

^{73/} Joint Sharing Agreement submitted by ORBCOMM, Starsys and VITA at pp. 4-5.

Starsys to calculate the impact of operating such a system in the lower half of the band.

Alternatively, ORBCOMM suggests that the Commission assign Little LEO System-2 to operate in the NVNG satellite service bands allocated at WRC-95. The 455-456 MHz and 459-460 MHz bands should be well-suited for DCAAS-like subscriber uplink operations. Moreover, as explained below, the Commission can and should reserve newly-allocated NVNG spectrum for the current applicants, at least initially.^{74/} Thus, ORBCOMM urges the Commission to consider modifying the NPRM proposal to use the 455-456 MHz and 459-460 MHz bands for the Little LEO System-2 uplinks rather than risking degradation of ORBCOMM's services.

C. Little LEO System-3

The NPRM also proposes authorizing a third new NVNG satellite system to operate its uplinks in 100 kHz of spectrum in the Transit Band (149.9-150.05 MHz), and to operate its downlinks (on a time-sharing basis) with DoD satellite systems operating in portions of the 400.15-401 MHz band.^{75/} As explained previously, ORBCOMM believes that it could make better use of the Transit Band spectrum for its gateway operations.^{76/} ORBCOMM thus suggests that the Commission also designate the 455-456 MHz and 459-460 MHz bands for the Little LEO System-3 uplinks, and allow ORBCOMM to use the Transit Band frequencies as specified in its

^{74/} See, pp. 44-46, infra.

^{75/} NPRM at ¶¶ 68-76.

^{76/} See pp. 7-8, supra.